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Fall 2020

CE 495-103: Civil Engineering Design II

Babu Veeregowda

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DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CE 495 Transportation Analysis and Design Fall 2020

Course Description:

Co-requisite or Pre-requisite: CE 333, CE 432, CE 443, CE 494

Canvas:

I self educated on using Canvas.

Instructor:

Babu Veeregowda, Ph.D, PE, PTOE

Office: Please contact by email

Office Hours: Dr. Veeregowda will be available online Thursdays from 7:00 to 8:00 PM by appointment only. If you need a 1 on 1 at the university please make an appointment.

Email: bkv4@njit.edu

Suggested Text:

Manual on Uniform Traffic Control Devices

Other documents provided

Course Sections:

Meeting	Section Dates			Topic/Assignment
1	September	1	2020	<p>Class 1: Course Introduction</p> <ul style="list-style-type: none">• Professor Introductions• Class Schedule• Project Overview – East Side Coastal Resiliency• Problem Statement<ul style="list-style-type: none">○ NYCDOT-OCMC typically allows five-hour closures and gives permits○ We want to use an innovative methodology that allows for 10-hour closures• Analysis Tools

				<ul style="list-style-type: none"> • What is MPT? • Quality Control • Course Deliverables
2	September	15	2020	<p>Class 2: Selecting the Right Traffic Analysis Program</p> <ul style="list-style-type: none"> • Determine goals and objectives • Determining Measures of Effectiveness • Determining the right analysis tools • Volume vs Demand • Impact Criteria • Screening Analyses • Using big data
3	September	22	2020	<p>Class 3: Data Collection and Summarization</p> <ul style="list-style-type: none"> • Data Collection <ul style="list-style-type: none"> ○ Traffic, Transit, and Pedestrian Counts ○ Signal Timings ○ Physical Inventory ○ Level of Service Observations ○ Historical Databases • Data Summarization <ul style="list-style-type: none"> ○ Eliminating outliers ○ Peak Hour Selection ○ Building a Network
4	September	29	2020	<p>Class 4: Traffic Engineering Standards and Guidelines</p> <ul style="list-style-type: none"> • Highway Capacity Manual (HCM) <ul style="list-style-type: none"> ○ Purpose ○ What it analyzes • Manual on Uniform Traffic Control Devices (MUTCD) <ul style="list-style-type: none"> ○ Purpose ○ What it analyzes • AASHTO Policy on Geometric Design (the Green Book) <ul style="list-style-type: none"> ○ Purpose ○ What it analyzes
5	September	6	2020	<p>Class 5:</p> <ul style="list-style-type: none"> • Synchro Introduction • Existing Analysis <ul style="list-style-type: none"> ○ Calibration and Validation • Work session <p>Deliverable 1 Draft Due</p>
6	October	13	2020	<p>Class 6:</p> <ul style="list-style-type: none"> • No Build Analysis • Travel Demand Forecasting - Diversions • Work session

7	October	20	2020	Class 7: MPT Analysis <ul style="list-style-type: none"> • Determining impacts • Developing mitigation strategies <ul style="list-style-type: none"> ○ Readily implementable measures ○ Complicated measures Deliverable 2 Draft Due
8	October	27	2020	Work Session Deliverable 1 Final and Deliverable 3 Draft Due
9	October	3	2020	MPT Drawings <ul style="list-style-type: none"> • Using the MUTCD • Drawing signs and striping
10	November	10	2020	Work Session Deliverable 2 Final and Deliverable 4 Draft Due
11	November	17	2020	Public Outreach <ul style="list-style-type: none"> ○ Community meetings ○ Social media campaigns Deliverable 3 Final Due
12	November	24	2020	Presentation Prep
13	December	1	2020	Class presentations Deliverable 4 Final and Deliverable 5 Due
14	December	8	2020	Receive faculty feedback Work session
15	December	15	2020	No Class - Deliverable 6 Due

Grading Policy:

- Periodically you will receive individual homework assignments. These will be graded individually and will collectively be worth 10% of your grade.
- Deliverables 1-4: One document will be submitted per group per deliverable. The deliverables will collectively be worth 30% of your grade. Your response to comments will play a role in determining the grade of each deliverable.
- Deliverable 5: Feedback on each group's presentation will be provided. The grade will be based on a combination of substance, presentation delivery, and the ability to keep the audience engaged. This will be worth 30% of your grade.
- Deliverable 6: The Transportation Management Plan, of which one will be submitted per group, will be reviewed to ensure completeness and effectiveness of mitigation, implementation, and outreach strategies. This will be worth 30% of your grade.

Grading Scale:

A:	100-90
B+:	89-85
B:	84-80
C+:	79-75
C:	74-70
D:	69-60
F:	Below 60

Attendance Policy:

Attendance is mandatory for all classes.

Withdrawals:

In order to insure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline will not be permitted unless extenuating circumstances (e.g., major family emergency or substantial medical difficulty) are documented. The course Professors and the Dean of Students are the principal points of contact for students considering withdrawals.

NJIT Honor Code:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Assignment Policy:

- Deliverable 1: Data collection and summarization (Draft technical memorandum due Class 5; final due Class 8)
 - Each group will submit a technical memorandum on how they used the data provided. Each group will describe how they summarized raw data that has been provided to them as a part of this class. Each group will explain how they accounted for variation in hour, day, and month to annualize the volumes. The memo will also include a balanced traffic network and the quality plan Each group is following.
- Deliverable 2: Analysis of Existing Conditions (Draft technical memorandum due Class 7; final due Class 10)
 - Each group will model existing conditions in Synchro. Each group will calibrate and validate existing conditions. Each group will submit a technical memorandum detailing the results of existing conditions as well as the calibration and validation methodology used.
- Deliverable 3: Analysis of No Build Conditions, and Trip Diversions (Draft technical memorandum due Class 8; final due Class 11)
 - Each group will grow existing volumes to the ETC year using historical data. Each group will perform analysis of No Build conditions in Synchro. Each group will utilize provided origin/destination data to create a diversion program and will reassign trips elsewhere through the roadway network. Each group will document the No Build results and diversion methodology in a technical memorandum.
- Deliverable 4: Analysis of MPT and Proposed Mitigation (Draft technical memorandum due Class 10; final due Class 13)
 - Each group will analyze the MPT conditions in Synchro and will attempt to mitigate as many impacts as feasible. Each group will document the mitigation measures and analysis results in a technical memorandum.
- Deliverable 5: Class presentation
 - Each group will provide a presentation in Class 13. The presentation will detail the analysis methodology and results, describe the mitigation measures, how to implement the measures, and a community outreach strategy.
- Deliverable 6: Transportation Management Plan (Due Class 15)

- Each group will formulate a technical memorandum that details a transportation management plan that contains the results of the analysis and mitigation measures. The plan will also include active strategies to implement these mitigation measures. The plan will also include a plan for community outreach. This plan will include an appendix with MPT drawings showing each stage. The drawings will comply with MUTCD standards and guidance.

Syllabus Information:

The dates and topics of the syllabus are subject to change; however, students will be consulted with and must agree to any modifications or deviations from the syllabus throughout the course of the semester.

Email Policy:

Please contact Dr. Veeregowda at bkv4@njit.edu or Adam at adselver15@gmail.com with any questions you may have.

Items Required for this Course:

N/A

Dress Policy:

N/A

Outcomes Course Matrix –

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1:			
Present an innovative transportation management plan that saves time and money while minimizing impacts to a real-world situation.	1,2,7	1,2	Deliverables 1-4, 6
Student Learning Outcome 2:			
Understanding impact assessment criteria and measures of effectiveness	2,4	1,2	Deliverables 1-4, 6
Student Learning Outcome 3:			
Work individually and within multi-disciplinary design teams	3,5	1,2	Deliverables 1-6

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our Program Educational Objectives are reflected in the achievements of our recent alumni:

1. Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward safe, practical, sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
2. Professional Growth: Alumni will advance their technical and interpersonal skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.
3. Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 2/13/18